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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 14

Application Number: 09/698,437
Filing Date: October 27, 2000
Appellant(s): GOYAL ET AL.

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For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 3/07/03.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-7, 10-18, 21 and 22 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,048,057 Saleh 9-1991

Fleming et al. " Generalized Multiple Description Vector Quantization" Data Compression Conference (March 29-31, 1999), pp. 3-14

Ingle et al. "DPCM System Design for Diversity Systems with Applications to Packetized Speech," IEEE Transactions on Speech and Audio Processing, Vol. 3, No. 1 (Jan 1995), pp. 48-57

Vaishampayan, V. A. "Design of Multiple Description Scalar Quanitzers," IEEE Transactions on Information Theory, Vol. 39, no. 3 (May 1993), pp. 821-834

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4, 7, 10, 11, 12, 13, 15, 18, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fleming et al. ("Generalized Multiple Descriptive Vector Quantization," Data Compression Conference, sponsored by IEEE Computer Society, March, 1999), hereinafter referred to as Fleming, in view of Saleh et al. (U.S. Patent 5,048,057), hereinafter referred to as Saleh.

Regarding claims 1 and 12, Fleming describes a wireless system that uses multiple descriptions during data transmission (abstract, pg. 4, last paragraph), which reads on "a wireless system with a multiple description coder operative to generate a plurality of different descriptions of a given portion of the signal"; Fleming also describes how in a multiple descriptive system designed with two data increments the data increments are broken into packets, where each packet is time-stamped and independently sent (pg. 4, third paragraph, and pg. 5, second paragraph), which reads on "the different descriptions of the given portion of the signal being arranged into packets."

Fleming, however, does not specifically mention that "at least a first description of the given portion is placed in a first packet and a second description of the given portion

is placed in a second packet," but an artisan at the time of the invention would have known that the packetized versions of the same portion of data would commonly be time-stamped, as indicated by Fleming, and then obviously send the packets sequentially with the first version first and the second version second.

In addition, Fleming does not specifically teach the use of a frequency hopping modulator; however, the examiner contends that the concept of a frequency hopping modulator used in a system exhibiting built-in diversity was well known in the art, as taught by Saleh.

In the same field of endeavor, Saleh describes a wireless local area network that uses a frequency hopping modulator connected to an encoder for channel coding (column 1, line 53, Figure 1).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming by specifically providing a frequency hopping modulator connected to an encoder, as taught by Saleh, for the purpose recovering lost information with a high probability (column 1, lines 53-56, also Figure 1). The resulting configuration reads on "a frequency hopping modulator having an input coupled to an output of the multiple description coder and operative to configure the packets for transmission."

Additionally, Fleming does not specifically teach "a hopping rate of the modulator is configured based at least in part on a number of descriptions generated for each of a plurality of different portions of the signal." However, the examiner contends that this concept was well known in the art, as taught by Saleh.

In Saleh's system, the signal points are rearranged for transmission in such a way that information is transmitted over a sequence of predefined "hopping" frequencies in a predefined order and each signal point from each codeword is transmitted on a respective different hopping frequency (column 1, lines 45-65), also Saleh suggests that the number of codewords transmitted on a given hopping frequency can have an effect on the rate at which the system needs to switch frequency (column 2, lines 1-8).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming, as taught by Saleh, by specifying a hopping frequency based on the number of descriptions such that lost information can be recovered with a high probability (column 1, lines 54-56).

Regarding claims 2 and 13, Fleming in view of Saleh disclose everything claimed, as applied above (see claim 1 and 12, respectively), in addition, Fleming discloses research that includes algorithms for the design of multiple description scalar quantizers for data transmission (pg. 6, first paragraph), which reads on "the multiple description coder comprises a multiple description coder configured to implement multiple description scalar quantization (MDSQ)."

Regarding claims 4 and 15, Fleming in view of Saleh disclose everything claimed, as applied above (see claims 1 and 12, respectively), in addition, Fleming discloses that the information to be transmitted is broken into small packets, each of which is time-stamped (pg. 4, paragraph 3), which reads on "each of the portions of the signal correspond to a designated segment of the signal having a particular time duration."

Regarding claims 7 and 18, Fleming in view of Saleh disclose everything claimed, as applied above (see claims 1 and 12, respectively); however, Fleming fails to specifically disclose that the frequency of the hopping modulator is configured such that each of the packets is transmitted using a different frequency. However, the examiner contends that such a use of hopping frequency was well known in the art, as taught by Saleh.

Saleh discloses a system in which information is communicated over a sequence of predefined "hopping" frequencies (column 1, lines 48-50) and a codeword(s) can be transmitted on a single hopping frequency before transmission proceeds to the next hopping frequency (column 2, lines 3-7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Fleming by configuring the frequency hopping modulator such that each of the packets is transmitted using a different frequency, as taught by Saleh, such that lost information can be recovered with a high probability (column 1, lines 55-57).

Regarding claims 10 and 21, Fleming in view of Saleh disclose everything claimed, as applied above (see claims 1 and 12, respectively). Fleming teaches that the information to be transmitted is broken up into a number of small packets (pg. 4, paragraph 3) and that for a two channel description of a signal there would be two data increments (pg. 5, paragraph 2). Fleming, however, does not teach the mixing of descriptions from current and previous portions of the signal. However, the examiner contends that such a mixing of data was well known in the art, as taught by Saleh.

Saleh teaches that information for codewords are made up from a number of signal points rearranged for transmission (column 1, lines 54-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Fleming by generating "two descriptions for each of a plurality of different portions of the signal, with a first one of the descriptions for a current one of the portions of the signal being placed in a current packet along with a second one of the descriptions for a previous portion of the signal," as taught by Saleh, so as to reduce the effects of data loss.

Regarding claims 11 and 22, Fleming in view of Saleh disclose everything claimed, as applied above (see claims 1 and 12, respectively). However, Fleming fails to specifically disclose that "the hopping rate of the frequency hopping modulator is selected such that a transmission delay of the system is not increased as a result of the transmission of the plurality of descriptions relative to a transmission delay of the system for single description transmission." However, the examiner contends that the relationship between transmission delay and hopping frequency was well known in the art, as taught by Saleh.

Saleh teaches that a number of codewords are transmitted on a single hopping frequency before transmission proceeds to the next hopping frequency since this reduces the rate at which the system needs to switch from one hopping frequency to another (column 2, line 1-7) where the suggestion here is that a reduced hopping rate, can reduce the overhead (delay) associated with a change in frequency.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Fleming by adjusting the hopping frequency modulator so as to not introduce excessive delay, as taught by Saleh, and hence maintain the same data transmission rate as in the case of the transmission of a single description.

3. Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fleming in view of Saleh, and further in view of Ingle et al ("DPCM System Design for Diversity Systems With Applications to Packetized Speech," IEEE Transactions on Speech and Audio Processing, Vol. 3, No. 1, Jan. 1995), hereinafter referred to ast Ingle and further in view of well known prior art (MPEP 2144.03).

Regarding claims 3 and 14, Fleming in view of Saleh disclose everything claimed as applied above (see claims 1 and 12, respectively); however Fleming in view of Saleh do not specifically disclose a multiple descriptive coder that comprises a multiple description adaptive differential pulse code modulation (ADPCM) coder. However, the examiner contends that the concept of using a DPCM (and hence an ADPCM) as a multibit coder was well known in the art, as taught by Ingle.

In the same field of endeavor, Ingle teaches the use of a multi-bit differential pulse-code modulator (DPCM) as a multiple descriptive coder (pg 48, section II, 1st paragraph).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming in view of Saleh by using a DPCM

coder, as taught by Ingle, for the purpose of coding the speech in a diversity system to better withstand packet losses (pg 48, section II, 1st paragraph).

Ingle does not specifically teach the use of an ADPCM as a coder; however the examiner takes official notice of the fact that a ADPCM system is a specialized form of a DPCM system.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming in view of Saleh and Ingle to use an ADPCM coder to improve the quality of the quantization at lower data rates.

4. Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fleming in view of Saleh, and further in view of Vaishampayan ("Design of Multiple Description Scalar Quantizers," IEEE Transactions on Information Theory, Vol. 39, No. 3, May 1993).

Regarding claims 5 and 16, Fleming in view of Saleh disclose everything as claimed above (see claims 1 and 12, respectively); however, Fleming in view of Saleh do not specifically teach that the signal comprises a speech signal. However, the examiner contends that the concept of using multiple description source codes in applications such as speech was well known in the art, as taught by Vaishampayan.

In the same field of endeavor, Vaishampayan teaches use of multiple description scalar quantizers in applications such as speech over packet-switched networks (pg. 821, column 2, paragraph four).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming in view of Saleh by specifically

applying multiple description coding techniques to speech signals, as taught by Vaishampayan, where packet losses can result in the degradation in signal quality.

5. Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fleming in view of Saleh, and further in view of well known prior art (MPEP 2144.03).

Regarding claims 6 and 17, Fleming in view of Saleh disclose everything as claimed above (in claims 1 and 12, respectively), in addition, Fleming discloses the use of packet-based communication protocols in wireless systems (pg. 4, paragraph 3); however, Fleming fails to specifically disclose that the wireless communications system comprises a cordless telephone system. However, the examiner takes official notice of the fact that the use of wireless technology for a telephone system was well known in the art.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Fleming in view of Saleh such that the wireless communications system included a telephone system, so as to make conversations over a wireless telephone system more reliable.

(11) Response to Argument

Issue 1

6. Applicant asserts on page 6:

> Applicants submit that there is no motivation to combine Fleming and Saleh in the manner urged by the Examiner. For example, there is no mention in Fleming of a frequency hopping modulator or the desirability of using such a modulator for transmission of multiple descriptions in the manner claimed. Similarly, there is no mention in Saleh regarding multiple

> descriptions or their use in conjunction with a frequency hopping modulator in the manner claimed. The Examiner has therefore failed to establish the first of the criteria specified in MPEP §706.020), that is, has failed to identify some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine the reference teachings. The Examiner instead relies upon impermissible hindsight to reconstruct the present invention from unrelated references.

In response to Applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, Saleh indicates that the combination of frequency hopping with *a form of channel coding* has been proposed (where the channel coding introduces redundancy) (col. 1, lines 39-35). In addition, Saleh motivates the combination of coding and frequency hopping by suggesting it might be an effective counter to fading and interference (col. 1, 29-30). Since multiple description coding is a coding technique used to reduce information loss during transmission (Fleming, §1) (which also introduces redundancy), the combination of frequency hopping with multiple description coding is obvious and motivated by the improved reliability of the signal transmission resulting from the combination.

7. Applicant asserts on page 7:

> To summarize, independent claims 1 and 12 in limitation *(ii) above require that the hopping rate of the modulator be configured based on the number of descriptions generated in a multiple description encoding process.* The Examiner has combined a pair of references, one a multiple description reference with no mention of frequency hopping and the other a frequency hopping reference with no mention of multiple descriptions, in an attempt to recreate the present invention based on the benefit of hindsight and without identifying a cogent motivation for the combination. Moreover, even if one were to assume for purposes of argument that the references are combinable, the combination fails to meet at least limitation (ii) above. (Italics added)

Saleh teaches that a number of codewords are transmitted on a single hopping frequency before transmission proceeds to the next frequency, so as to reduce the rate at which the system needs to switch from one hopping frequency to another (col. 1, line 67 through col. 2, line 7). The suggested motivation for reducing the switching rate is to decrease the switching overhead and thus allow more data to be transferred (before introducing unacceptable delay), but too low a hopping rate would result in too much redundant data being transmitted on a single frequency making the data more susceptible to loss (e.g., if the current frequency faded). Thus the calculation of the optimum hopping rate has to take into consideration the amount of (redundant) data (i.e., the number of descriptions being generated), so as to distribute the descriptions over the frequencies, which is suggested by Saleh.

The argument concerning the combination of Fleming and Saleh is given above in §6. Furthermore, the argument (Appeal Brief, p. 8, middle of page) concerning the use of multiple description coding does not apply since multiple description coding is taught by in the primary reference (Fleming, §1 Introduction).

8. Applicant asserts on page 9:

> Saleh to the effect that "some form of conventional channel coding may be used" in conjunction with frequency hopping, fails to provide adequate motivation to combine Saleh with Fleming. The Examiner instead appears to be making the connection between this statement in Saleh and the Fleming reference based solely on Applicants' disclosure, and not on any "objective evidence of record." In other words, the Examiner is reconstructing Applicants' claimed invention based on impermissible hindsight.

See the argument above given in §6.

9. Applicant asserts on page 9:

> With regard to claims 10 and 21, these claims specify that two descriptions are generated for each of a plurality of different portions of the signal, with a first one of the descriptions for a current one of the portions of the signal being placed in a current packet along with a second one of the descriptions for a previous portion of the signal. These claims thus incorporate particular limitations of the two-description example in the illustrative embodiment of the invention cited above, and are not taught or suggested by the cited references. The Examiner in rejecting these claims does not rely on specific teachings from the references, but instead upon subjective belief, which as noted above fails to meet the criteria for a proper § 103(a) rejection.

Fleming gives the example of a two-channel (or packet) multiple description system (p.5, ¶2) (transmitting redundant data) and Saleh teaches the mixing of codewords (redundant data) with codewords representing the previous and current portions of the signal, where the combination of the teachings of Fleming and Saleh is motivated by the further reduction in data loss.

10. Applicant asserts on page 9:

> With regard to claims 11 and 22, these claims specify that the hopping rate of the frequency hopping modulator is selected such that a transmission delay of the system is not increased as a result of the transmission of the plurality of descriptions relative to a transmission delay of the system for single description transmission. Applicants submit that such an arrangement is not taught or suggested by the proposed combination of Fleming and Saleh. The Examiner acknowledges that Fleming fails to meet the limitations of claims I 1 and 22, but argues that sufficient teachings are provided in column 2, lines 2-7 of Saleh (Final Office Action, page 7, first paragraph). However, this portion of Saleh simply refers to reducing the hopping rate under certain conditions. It does not teach or suggest the particular limitations in question.

As argued above in §7 and the rejection of claims 11 and 22, switching during frequency hopping has an overhead. Too high a switching rate can introduce delay, which suggests the need to reduce the hopping frequency (Saleh, col. 2, lines 1-7).

Issue 2

See above arguments and the rejection of claims 3 and 14.

Issue 3

See above arguments and the rejection of claims 5 and 16.

Issue 4

See above arguments and the rejection of claims 6 and 17.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

V. Paul Harper

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April 18, 2003

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